



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of OKAZAKI et al.

Serial No.: 09/883,406

Art Unit: 1711

Filed : June 19, 2001

Examiner : MCCLENDON, Sanza L.

For : CROSSLINKABLE RESIN COMPOSITIONS

Declaration

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

I, Kentaro YACHI, do hereby declare that:

I graduated in March 1999 from the master course of the Graduate School of Engineering of Kyoto University majoring in material chemistry, and since then have been employed by TOAGOSEI CO., LTD., and have been engaged in UFO project of the company from April 1999 through March 2001, in Macromolecular Material Research Laboratory of the company from April 2001 through January 2003, in HOG project of the company from February 2003 through June 2004, and in Macromolecular Material Research Laboratory of the company from July 2004;

I have read and understood the specification of said application, and am familiar with the prosecution history of said application, and I have read and understood the office action dated on June 1, 2004;

I made the following experiments from August 24 through August 27, 2004 at the Macromolecular Material Research Laboratory of TOAGOSEI CO., LTD., in order to show that WO98/11152 (hereinafter referred to as "Thepot reference") that has been cited by Examiner in the above office action does not suggest the present invention.

Experiments

1. Purpose

The experiments were conducted to prepare a composition described in the Thepot reference and compare it with the present composition, in order to show that the present composition is superior in curability to the composition described in the Thepot reference.

2. Method of Experiments

(1) Preparation of compositions

(1-1) The composition of the present invention

A composition containing 49.7 % by weight of the copolymer obtained in Production Example 1-1 of the present specification and 50.3 % by weight of butyl acetate was used as an example of the present composition, which will hereinafter be referred to as "composition T".

(1-2) The composition of the Thepot reference

A compound having a maleimide group and an internal olefin was prepared in the same manner as described in Synthesis Example 1 of the Thepot reference, except that the amounts of raw materials were changed to those shown below:

• isopropanolamine: 0.5 mol,

- maleic anhydride in 100ml of acetone: 0.5 mol,
- toluene: 300 ml,
- maleic anhydride: 2 mol,
- propylene glycol: 134 g.

Reaction was terminated when the acid value reached 68 mg KOH/g. The obtained compound had a number average molecular weight of 2,000 which was determined by gel permeation chromatography and converted to polystyrene equivalent. The compound had maleimide groups in an amount of 0.4 mol/kg.

The obtained compound was diluted with methyl ethyl ketone to yield a composition containing the compound in an amount of 50% by weight based on the composition, which will hereinafter be referred to as "composition C".

3. Evaluation

These compositions T and C were each used without addition of photopolymerization initiators.

A bonderized steel sheet (PB-144 (trade name) manufactured by Nippon Testpanel Co., Ltd) was used as a substrate. The compositions T and C were each coated onto the substrate to have a thickness of 20 μ m after dried. The compositions were each dried at 80°C for 10 min. The compositions were each cured by irradiating the dried coating with UV light of various quantities shown in Table 1 using an 80 W/cm condensing-type high-pressure mercury lamp (single lamp at 10 cm height; conveyor speed of 10 m/min). The light quantities were dependent upon the number of passes of the conveyor.

Curability was evaluated by way of solvent resistance of the cured coatings. The solvent resistance was evaluated by acetone-rubbing test in which the cured coatings were rubbed with cotton swabs impregnated with acetone to obtain the number of rubbing until the coatings were dissolved.

Table 1

Conditions of UV irradiation		Composition T (the number of rubbing)	Composition C (the number of rubbing)
Quantity of irradiation (mJ/cm ²)	The number of passes		
260	1	10	1 or less
520	2	26	1 or less
780	3	50 or more	1 or less
1040	4	50 or more	1 or less
6760	26	Not determined.	30

4. Discussion

The results of evaluation are shown in the above Table 1.

Apparently from the Table 1, the present composition T is excellent in solvent resistance, showing the number of rubbing with acetone of up to 10 even at a low quantity (260 mJ/cm²) of UV light irradiation and showing the number of rubbing with acetone of 50 or more at 780 mJ/cm² of UV light irradiation. In other words, the present composition T shows excellent curability even at a low quantity of UV light irradiation.

On the other hand, the composition C of the Thepot reference is inferior in solvent resistance and poor in curability, showing the number of rubbing with acetone of 1 or less even at a large quantity (1040 mJ/cm²) of UV light

irradiation. The composition C only provided a practically usable cured product at a very large quantity (6760 mJ/cm²) of UV light irradiation.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: September 28, 2004

Kentaro Yachi
Kentaro YACHI